

CHAPTER 8. RESEARCH AND DEVELOPMENT

8.1. Introduction

Three of the central goals of the NAAHP are to protect the health of farm raised aquatic animals; ensure the availability of diagnostic, inspection, and certification services; and minimize the impacts of disease when they occur in farmed or wild aquatic animals. To meet these goals it is necessary to have continued advancement in research and development (R&D) of aquatic animal health issues.

The purpose of this chapter is to address how existing funding mechanisms for aquatic animal health R&D might be optimized to meet the research needs of the NAAHP and its stakeholders.

8.2. Research Funding

The first step in identifying gaps in current R&D efforts is to look at research that is currently underway. Multiple Federal agencies have grant programs that provide funding for research related to aquatic animal health.

8.2.1. U.S. Department of Agriculture (USDA)

The USDA has various funding opportunities, including the Cooperative State Research Education and Extension Services (CSREES) and the Agriculture Research Services (ARS). Both work cooperatively with APHIS to identify research needs in support of APHIS animal health programs

CSREES research prioritization is based on multiple sources. State and regional research needs are reported via regional aquaculture centers to CSREES. CSREES also looks to the Joint Subcommittee on Aquaculture (JSA) R&D plan.

ARS research prioritization is based on stakeholder input from major commodity groups. Meetings with these commodity groups are planned at regular intervals. Technology transfer is an important component of the research agenda, and Cooperative Research and Development Agreements (CRADA) are important in ensuring research is utilized (e.g., vaccine development).

8.2.2. Department of the Interior (DOI)

There is no extramural funding within DOI. However, science support can be carried out at the FWS fish health centers or technology centers. Research at fish health centers is field-related; that is, it is focused on localized issues. Research priorities are driven by the FWS regions.

The DOI United States Geological Survey (USGS) conducts research primarily in support of natural resource needs that have been forwarded to the USGS from other DOI

Agencies, such as FWS. The research is therefore a service provided internally within the Department, although some of those research concerns may be similar or the same as industry concerns as well.

8.2.3. U.S. Department of Commerce (DOC)

The DOC has various funding opportunities including the Sea Grant program, Advanced Technology Program (ATP), and Small Business Innovative Research (SBIR) Program.

The NOAA Sea Grant funding is distributed to State programs that fund research, extension, and education, as well as to some larger national programs. National programs that are funded are either identified in a strategic plan or have been made through Congressional earmarks. Sea Grant State programs tend to be smaller, quick response-type programs and National projects tend to be larger and are often multi-State and multi-institutional. Sea Grant looks to the JSA R&D plan and to other stakeholder groups for prioritization of R&D projects.

The SBIR program and ATP program at the DOC's National Institute for Science and Technology (NIST) are used to connect to industry and must have an industry partner. The ATP projects tend to be highly innovative and are therefore often not supported by traditional grant programs.

8.2.4. State, regional and industry funding sources

Cooperative funding may be useful for implementing future programs. Funding from groups such as the Great Lakes Fishery Commission and industry associations should be considered.

8.3. Research Planning

8.3.1. JSA Research and Technology Task Force

The new research and development task force under the JSA is charged with updating the 1994 JSA R&D strategic plan and enhancing interagency cooperation and collaboration in research.

A two-year timeline is expected to update the R&D strategic plan. All Federal agencies involved in aquaculture research will be represented on the R&D task force to ensure all needs are reflected in the updated strategic plan. Research needs identified by the NAAHP Task Force as well as those identified by other stakeholders will be considered. The goal is to be responsive to stakeholders' needs yet remain broad based. There will be overlap of members of the R&D task force with the NAAHP Task Force to further ensure awareness of the needs of the NAAHP.

8.3.2. Databases of Research Projects

Information on all research projects funded by CSREES or conducted by ARS is stored in the Current Research Information System (CRIS). This system is used only by ARS and CSREES. Data on Sea Grant supported programs is stored by State; there is no national listing of all Sea Grant projects. Information on SBIR and ATP programs is not readily accessible, and confidentiality is an issue as these projects are often related to a business idea. However, some basic information on these projects would be useful to the research community and should be available in a database without compromising confidentiality. This data accessibility benefits research by eliminating or reducing duplicate research projects, and increasing the funds available for other projects. Ideally the CRIS or similar system could be expanded across agencies and would then facilitate enhanced collaboration on aquaculture-related research across agencies.

8.3.3. Databases of Researchers and Major Research Interests

There is no single source of information on aquaculture researchers and their major areas of interest. Development of a database that could store such information would be useful. If an immediate research question arises, one would have access not only to what research is currently being done, but what researchers may be able to assist in addressing the question based on historical projects and interests.

8.4. Research Needs Assessment

Areas in which research is needed were determined from working group meetings and stakeholder comments. Industry, States, Tribes, and other stakeholders may need to work together to prioritize these needs.

8.4.1. Industry Needs

8.4.1.1. Crustaceans

Six general areas that need to be addressed for crustaceans include epidemiology and identification of risk factors, identification of reservoir hosts and sources of infection, breeding genetics, innate immunity, pathogenesis factors, and evolution of pathogens.

8.4.1.2. Finfish

Areas of interest for increased research include host ranges; routes of transmission and efficient diagnostic tests for emerging pathogens and PAADs; current range of fish pathogens (PAADs and RAADs) in the United States; easily deliverable, efficacious vaccines and gathering of field vaccine efficacy data; species susceptibility for PAADs and RAADs that are new to the United States, such as SVC; cost-effective mass immunization strategies; environmental fate of fish pathogens; accurate risk assessment techniques; and cost-effective fish health enhancement via diets and/or immunostimulants.

8.4.1.3. Molluskan shellfish

Basic research needs include increased knowledge in molluskan immunology and basic diagnostic tools.

8.4.2. Natural Resource Needs

Research needs for aquatic animal health from the resource perspective are focused on how to prevent entry or control pathogen spread once it has entered the environment. Related to these needs are host and geographic range of PAADs and RAADs, species susceptibility to PAADs and RAADs, environmental fate of pathogens, and risk assessment techniques.

8.4.3. Federal Priorities

National research priorities will focus on information needed to support NAAHP activities and will include the priorities listed for both industry and natural resources. However, within those needs, NAAHP research priorities will focus on pathogens listed as PAADs and emerging diseases.

8.4.4. State, Tribal and Regional Priorities

Pathogens of regional importance to both natural resources and industry will not be included as PAADs in the NAAHP. Therefore, it is important that regional organizations or States that deal with these pathogens ensure that their research priorities are sent forward via the JSA R&D task force or through other venues.

8.4.5. Long-Term vs. Short-Term Needs

Most extramural funding is based on a relatively short time frame to address research questions. Some examples include projects related to species susceptibility for ISA or SVC. Short-term projects may range from 1 to 4 years in length and usually address issues of immediate concern. There may be long-term issues that need to be addressed and would involve a multiyear, multi-institutional, high-investment approach. Such projects may include basic immunology of aquatic animals or basic assessment of a pathogen.

8.5. Interagency Collaboration and Cooperation

The JSA R&D task force is the primary avenue through which interagency collaboration and cooperation in aquatic animal health are coordinated. Updating the R&D strategic plan will involve the key Federal agencies and will provide the template for broad-based areas of aquaculture research, including aquatic animal health. All Federal agencies with an involvement in aquatic animal health may have a representative on the R&D task force.

8.6. Recommendations

8.6.1. Interactions with JSA Research and Technology Task Force

The R&D task force and the National Aquatic Animal Health Task Force on Aquaculture (NAAHTF) each have a liaison to the other. Crossing membership across JSA task forces ensures that NAAHTF research needs are considered, and these liaison positions should be maintained.

8.6.2. Forum for Input from Stakeholder

Stakeholders and the NAAHTF should meet on a set schedule to discuss areas of research priorities. Similar to the advisory committees suggested in Chapter 5 on surveillance, the R&D advisory committee based on an NPIP model is one that allows for input from all stakeholders. The NAAHTF could then solicit stakeholder input and report back to the JSA R&D task force.

8.6.3. Shared Databases with Research Project Information

As discussed in section 8.3.2, there is one database, CRIS, that maintains data on current USDA intramural (ARS) and extramural (CSREES) research on aquaculture. We recommend that either CRIS be expanded or a new database developed that would allow access to information on current research projects related to aquatic animal health, conducted by Federal and other agencies. The information in this database should be made available to stakeholders.

In addition to this database, we also recommend that a second database, or a subset of the research database, be developed for names of aquatic animal health researchers and their main areas of research interest, cross-referenced to the research database that would show current projects. This database would enable all stakeholders find information on research that is being conducted in aquatic animal health, and would assist Federal and State agencies that either conduct or support extramural research to ensure that research efforts are not duplicated.